HP-60/70 SERVICE NOTES

SPECIFICATIONS

First Edition

Keyboard . . . . HP-60: 61 keys C1-C6/HP-70: 75 keys F1-G7
Tunable range . . . . HP-60: +39 cents, —50 cents
HP-70: +30 cents, —55 cents
Output level . . . . H: 0dB/M: —10dB/L: —20dB
(0dB = 7V p-p @ mid. C, ff)
Input level . . . . H: +6dBm/M: —9dBm/L: —24dBm
Speaker . . . . 10cm x 2
Output power . . . . 2W x 2 (rms)
Power consumption . . . HP-60: 23W/HP-70: 26W
Dimensions . . . . HP-60: 915(W) x 300(D) x 130(H)mm 10.1 kg
HP-70: 1105(W) x 300(D) x 130(H)mm 12 kg
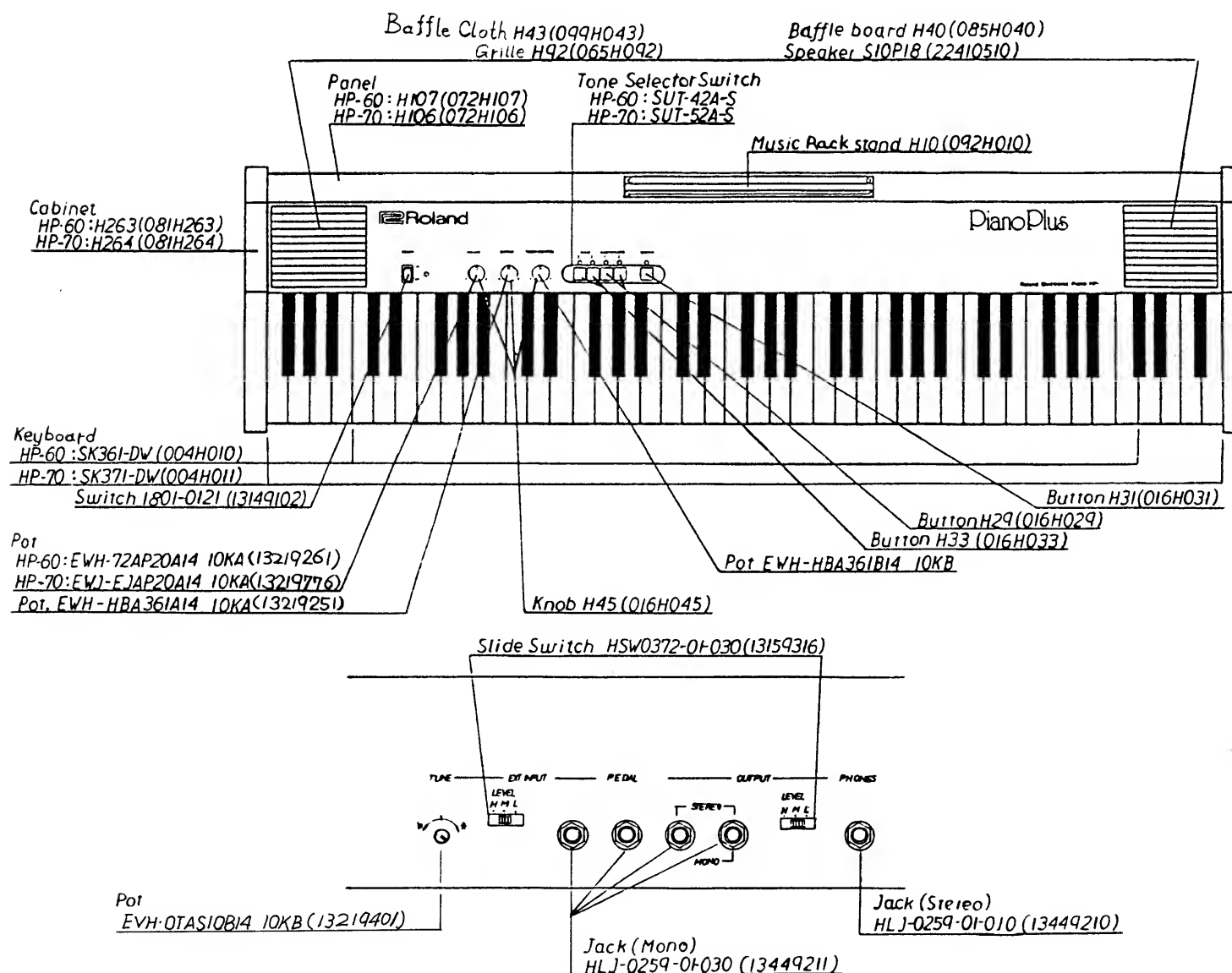
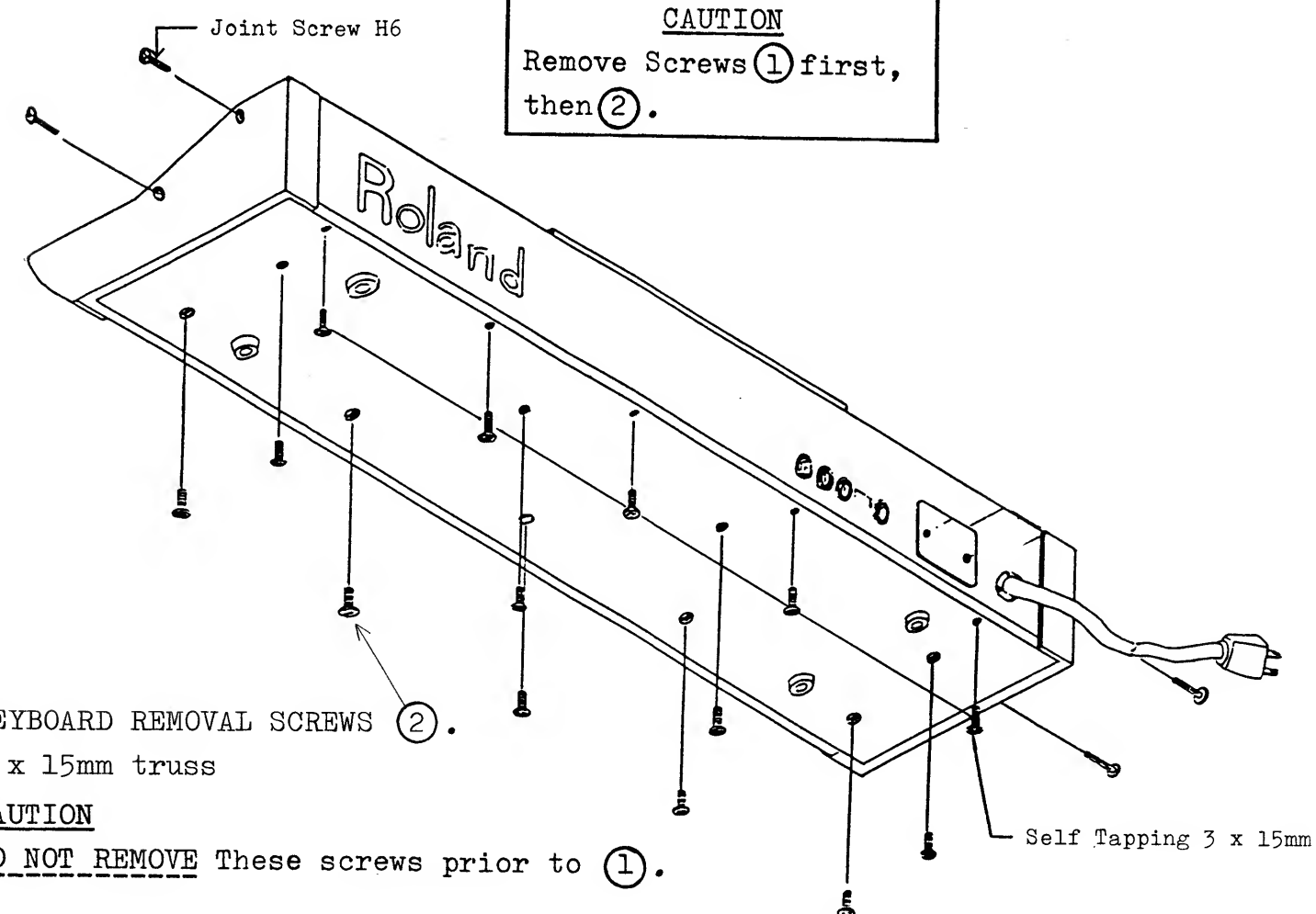KEYBOARD REMOVAL SCREWS ①.
Self Tapping 3 x 25mm Al binding
REMOVE THESE SCREWS FIRST.

Wood Screw 3.1 x 10mm

Collar Bushing TA-314, TB-300

Flat Washer 3 x 12 x 0.8mm

PANEL
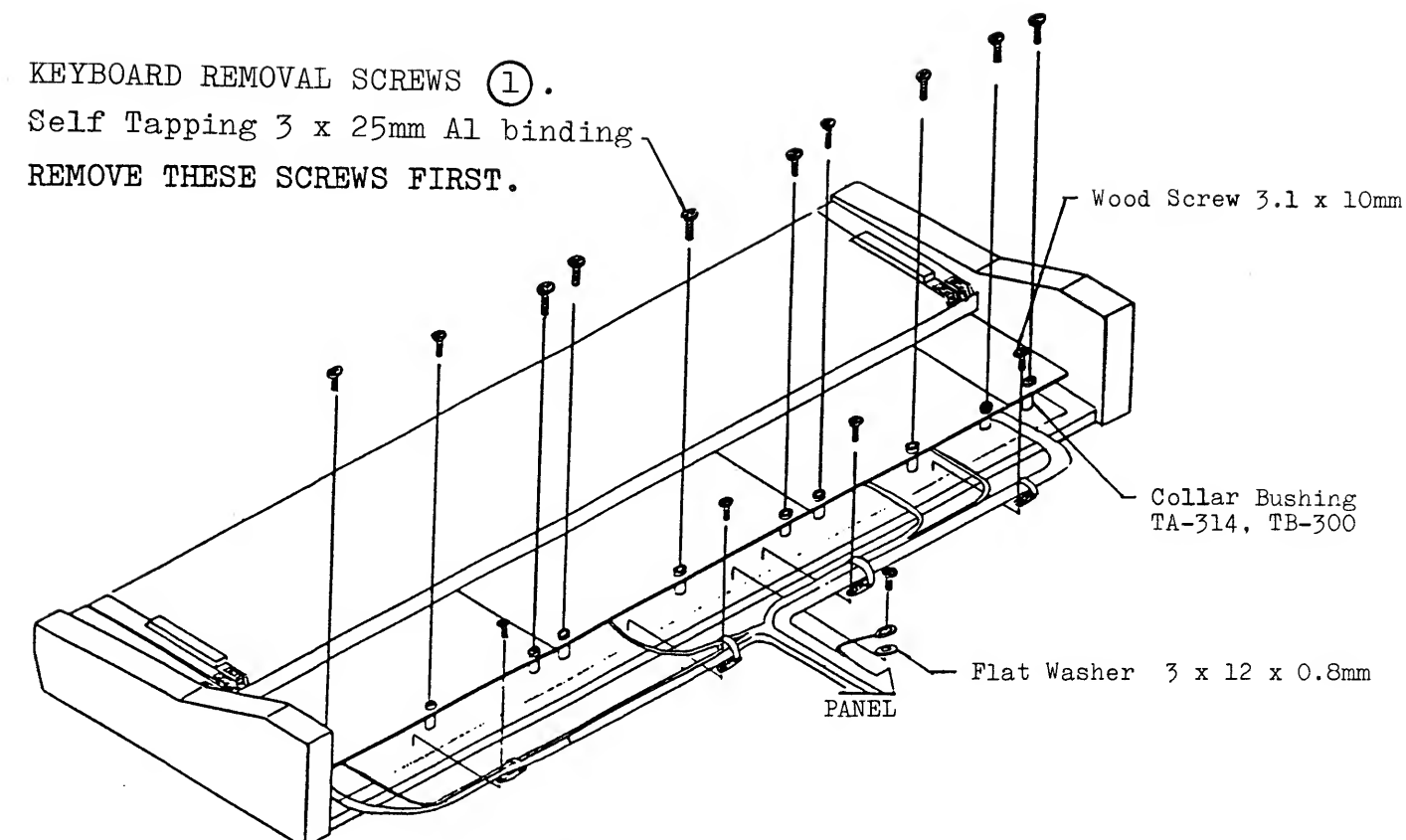
KEYBOARD REMOVAL SCREWS
CAUTION
Remove Screws ① first,
then ②.

Joint Screw H6

KEYBOARD REMOVAL SCREWS ②.
4 x 15mm truss

CAUTION
DO NOT REMOVE These screws prior to ①.

Self Tapping 3 x 15mm

Baffle Cloth H43 (099H043)
Grille H92 (065H092)
Baffle board H40 (085H040)
Speaker S10P18 (22410510)

Panel
HP-60: H107 (072H107)
HP-70: H106 (072H106)

Tone Selector Switch
HP-60: SUT-42A-S
HP-70: SUT-52A-S

Music Rack stand H10 (092H010)

Cabinet
HP-60: H263 (081H263)
HP-70: H264 (081H264)

PianoPlus

Keyboard
HP-60: SK361-DW (004H010)
HP-70: SK371-DW (004H011)
Switch 1801-0121 (13149102)

Button H31 (016H031)
Button H29 (016H029)
Button H33 (016H033)

Pot
HP-60: EWH-72AP20A14 10KA (13219261)
HP-70: EWJ-EJAP20A14 10KA (13219776)
Pot. EWH-HBA361A14 10KA (13219251)

Pot EWH-HBA361B14 10KB

Knob H45 (016H045)

Slide Switch HSW0372-01-030 (13159316)

TUNE   EXT INPUT   PEDAL   OUTPUT   PHONES
LEVEL   H M L   STEREO   LEVEL H M L
                     MONO

Pot
EVH-0TAS10B14 10KB (13219401)

Jack (Mono)
HLJ-0259-01-030 (13449211)

Jack (Stereo)
HLJ-0259-01-010 (13449210)

SK－361Dw (HP-60)
SK－371Aw (HP-70) **Parts List**
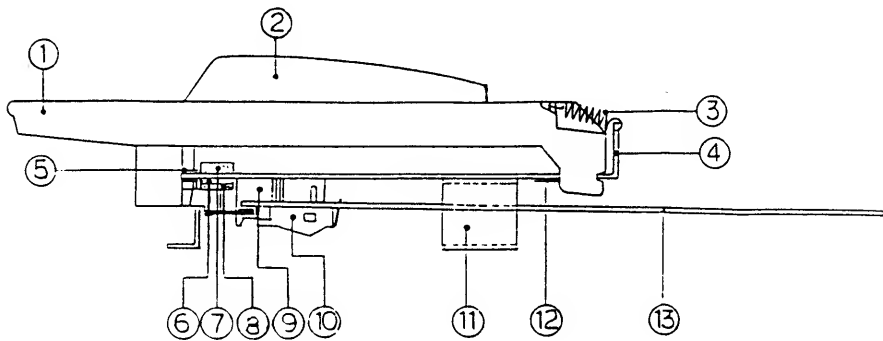
1	106 H 026	Natural Key (With Weight)	C F
1	027	"	D
1	028	"	E B
1	029	"	G
1	030	"	A
1	031	"	C' F'
1	035	"	G'
2	032	Sharp Key (With Weight)	
3	070H 029	Sharp Key Spring H29	
3	034	Natural Key Spring H 34	
4	061 H 135	Chassis H135 (61 Notes) HP-60	
4	061 H 123	" H123 (75 Notes) HP-70	
5	068H 004	Guide Bush	
6	107 H C64	Cushion H64	
7	071 H 143	Stop Felt H143 (61 Notes) HP-60	
7	167	" H 167 (75 Notes) HP-70	
8	071 H 168	Level Felt H 168 (61 Notes) HP-60	
8	169	" H 169 (75 Notes) HP-70	
9	104 H 037	Holder H37	
10	004H 009	Switch H 9	
11	062H 027	Chassis Stand H 27	
11	028	" H 28	
12	098H 006	Key Stopper H6	
13	G.T.H 48 . 49 . 50 .	(61 Notes) HP-60	
13	GTH 51 . 52 . 53 . 54 .	(75 Notes) HP-70	

Key Removal

1. Remove Screw ①.
2. Remove Key Stopper ②.
3. Remove Key Spring ③.
   Identify Key Spring if White
   and Black Keys are removed,
   they are different in tention.
4. Pull out and up on front end of Key④.
This will disengage the Key from its mounting.

③ Key Spring
② Key Stopper
① Screw
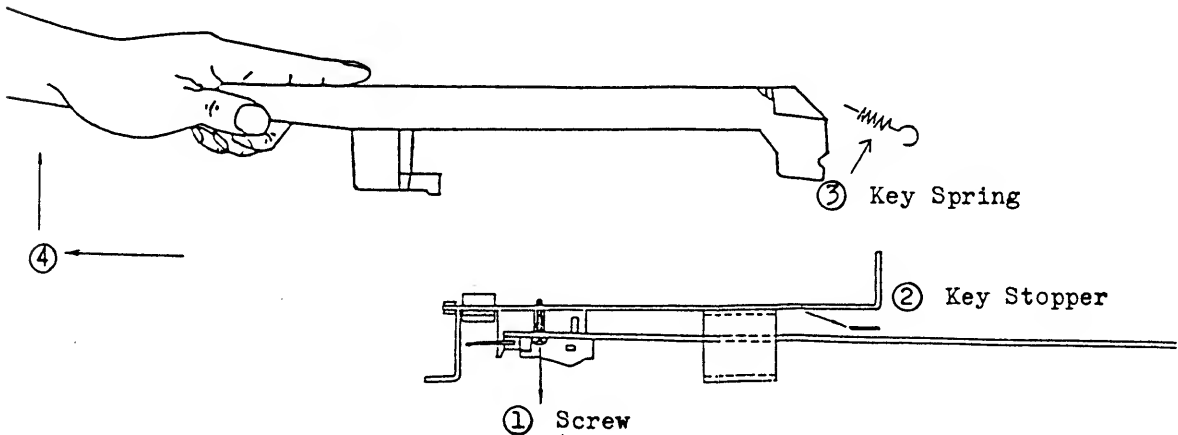
Key Installation
Reverse the order for Key Removal.

PARTS LIST

☆ : HP-60 ★ : HP-70

CASE

☆	081H263	Cabinet H263
★	081H264	Cabinet H264
☆	072H107	Panel H107
★	072H106	Panel H106
	092H010	Music Rack Stand H10
	065H092	Grille H92
	099H043	Baffle Cloth H43
	085H040	Baffle Board H40
	092H011	Music Rack H11 (option)
★	131H059	Dust Cover H59
☆	131H060	Dust Cover H60

KEYBOARD

| ☆ | 004H010 | SK-361-DW C-C 61 notes |
| ★ | 004H011 | SK-371-DW F-G 75 notes |

KNOB, BUTTON

	016H045	Knob H45
	016H033	Button H33 ivory
	016H029	Button H29 orange
★	016H031	Button H31 lime

SWITCH, JACK

	13149102	Switch	1801-0121 Power
☆	13129533	Switch	SUT-42A-S
★	13129534	Switch	SUT-52A-S
	13159316	Slide Switch	HSW-0372-01-030
	13449210	Jack (Stereo)	HLJ-0259-01-010
	13449211	Jack (Mono)	HLJ-0259-01-030
	2215070400	Jack Nut	N-704

COIL, TRANSFORMER

	12449222	Coil P-75 101 100μH
	022H047J	PT-H47J 100V
	022H047C	PT-H47C 117V
	022H047D	PT-H47D 220/240V

PCB ASSEMBLY

☆	149H152	Switch Board	OPH152 (pcb 052H320A)
★	149H153	Switch Board	OPH153 (pcb 052H320A)
☆	141H035	Amp Board	APH035 (pcb 052H319A)
★	147H036	Amp Board	APH036 (pcb 052H319A)
☆	147H048	Gate Board	GTH048 (pcb 052H317B)
☆	147H049	Gate Board	GTH049 (pcb 052H316B)
☆	147H050	Gate Board	GTH050 (pcb 052H316B)
★	147H051	Gate Board	GTH051 (pcb 052H318C)
★	147H052	Gate Board	GTH052 (pcb 052H316B)
★	147H053	Gate Board	GTH053 (pcb 052H316B)
★	147H054	Gate Board	GTH054 (pcb 052H316B)

IC

| | 15179129 | TMS3615-25NS |

HP-60/70 design requires relatively uniform threshold of the TMS-3615's in a unit to sound notes having similar contour (lengths of decay and release).
To meet this the Roland selects the devices to grades as follows:
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 2.0 — marked on face.
When replacing, use the same number as on existing.

	15189105	μPC4558
	15229802	BA662A
	15199510	LA4440 stereo power amp 6W
	15199105N0	μPC14315H or μA7815UC (15199105F0) regulator
	15169504	MN3101 BBD driver
	15219213	MN3009 BBD 256-stage

TRANSISTOR

	15119113	2SA1015-GR
	15129114	2SC1815-GR
	15129121	2SC2021-R
	15119806	2SB596-O
	15139101	2SK30A-GR

DIODE

	15019518	RD4.7EB zener
	15019252	1SS84
	15019101	1S1555
	15019236	W02 rectifier stack
	15029103	TLR-124 LED

POTENTIOMETER

☆	13219261	EWH-72AP20A14 10kA
★	13219776	EWJ-EJAP20A14 10kA x 2
	13219251	EWH-HBA361A14 10kA center click
	13219252	EWH-HBA361B14 10kB center click
	13219401	EVH-OTAS10B14 10kB
	13299106	EVT-R4SA00B53 5kB trimmer
	13299101	EVT-R4SA00B14 10kB trimmer
	13299102	EVT-R4SA00B15 100kB trimmer

FUSE

	12559138	MGP 0.75A pri. 100V
	12559313	MGP 0.75A CSA pri. 117V
	12559507	CEE T200mA pri. 220/240V
	12559521	CEE T1.6A sec. 220/240V
	12559514	CEE T2.0A sec. 220/240V

OTHERS

| | 22410510 | Speaker S10P18 |
| | 048H028 | Heat Sink H28 |

TMS 3615
Octave Multipule Tone Synthesizer

TOP VIEW

NC	1	28	NC
$16'I_{OUT}$	2	27	$8'I_{OUT}$
SUSTAIN BIAS	3	26	STB OUT
V_{SS}	4	25	STB IN
K 8	5	24	K7
K 9	6	23	K6
K10	7	22	K5
K11	8	21	K4
K12	9	20	K3
K13	10	19	K2
RESET OUT	11	18	K1
CLOK IN	12	17	RESET IN
V_{DD}	13	16	CLOCK OUT
N_C	14	15	NC

— KEY DESIGNATION —

F1 C1   C3 mid.   C6 G7
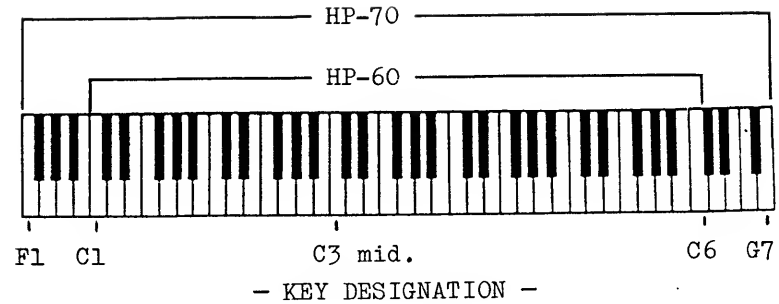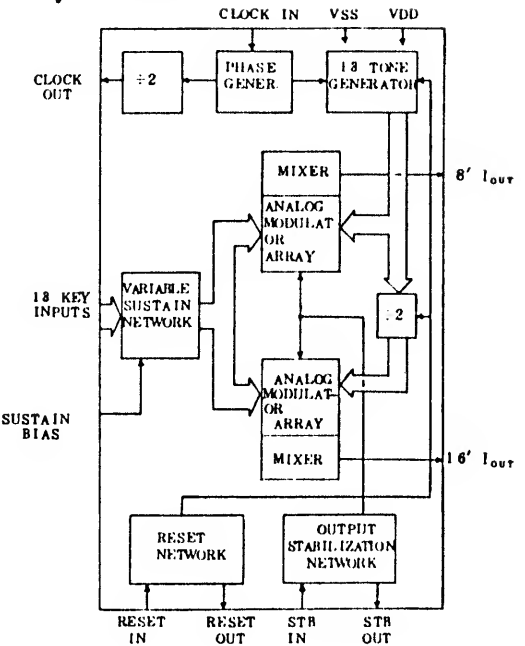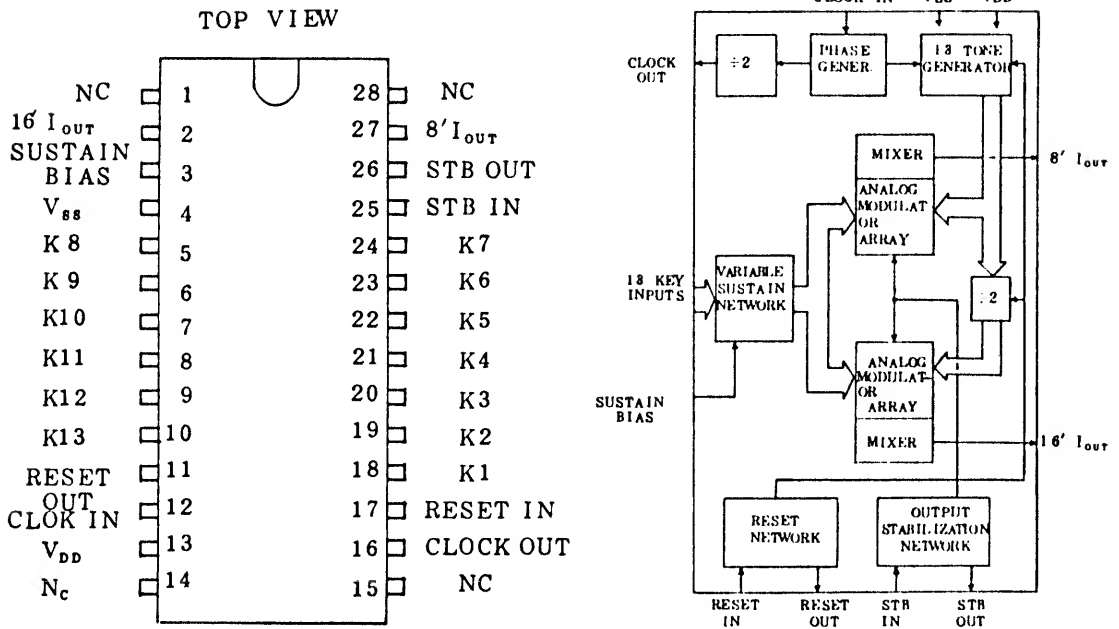
ADJUSTMENTS

HP-70	Gate	GTH051	GTH052	GTH053	GTH054		
	Key	G1	G2	G3	G4	G5	G6	G7
	Trimmer	VR1	VR1	VR4	VR1	VR4	VR1	VR4
	Check point	CP1	CP1	CP2	CP1	CP2	CP1	CP2

HP-60	Gate	GTH048	GTH049	GTH050	
	Key	C2	C3	C4	C5	C6
	Trimmer	VR1	VR1	VR4	VR1	VR4
	Check point	CP1	CP1	CP2	CP1	CP2
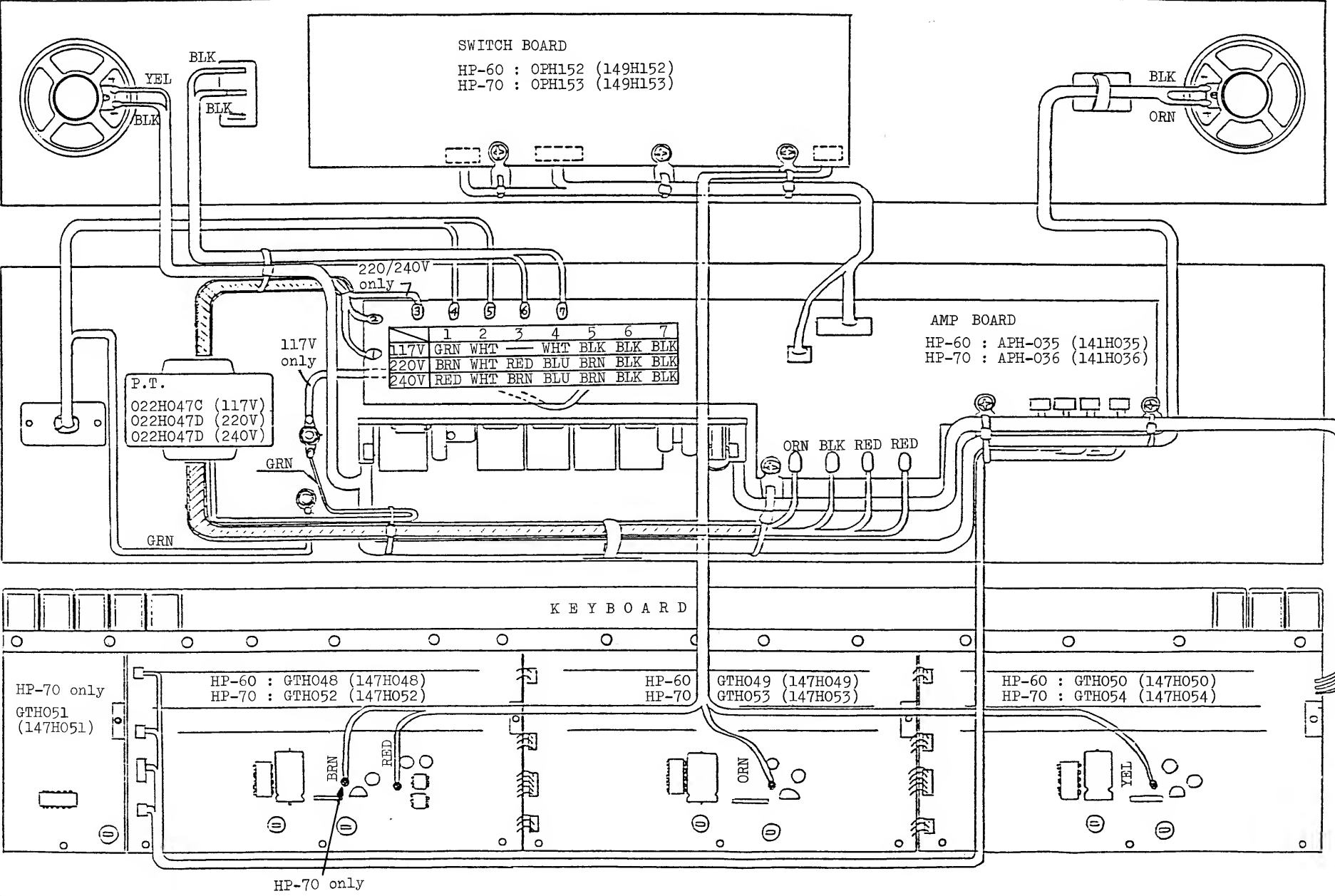
GTH

P-P LEVEL

Set TOUCH CONTROL VR3 at center click.

With the combination shown above.
Play the key gently and adjust the VR for.
1.2V p-p waveform.

(VCF)
VR2 and VR3 are for factory set only.
Do not touch them.

APH036 (HP-70 only)

CHORUS SPEED

Connect oscilloscope to CP3.

Adjust VR2 for:

|← 1.5 SEC →|
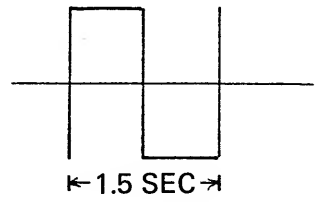
BBD BIAS

Scope to CP4.
Feed sine wave to CP5 with its level adjusted
for 4V p-p at CP4.
Adjust VR1 for symmetrically flatened peaks.

SWITCH BOARD
HP-60 : OPH152 (149H152)
HP-70 : OPH153 (149H153)

AMP BOARD
HP-60 : APH-035 (141H035)
HP-70 : APH-036 (141H036)

220/240V only

117V only

P.T.
022HO47C (117V)
022HO47D (220V)
022HO47D (240V)

	1	2	3	4	5	6	7
117V	GRN	WHT	—	WHT	BLK	BLK	BLK
220V	BRN	WHT	RED	BLU	BRN	BLK	BLK
240V	RED	WHT	BRN	BLU	BRN	BLK	BLK

ORN BLK RED RED

KEYBOARD

HP-70 only
GTHO51 (147H051)

HP-60 : GTHO48 (147H048)
HP-70 : GTHO52 (147H052)

HP-60 : GTHO49 (147H049)
HP-70 : GTHO53 (147H053)

HP-60 : GTHO50 (147H050)
HP-70 : GTHO54 (147H054)

HP-70 only

HP-60.70 SCHEMATIC DIAGRAM

PARTS	SWITCH BOARD	AMP BOARD	JACK BOARD
2SA1015 GR	Q2, Q3, Q4, Q6	Q1	Q1
2SC1815 GR	Q1	Q3, Q6, Q7	Q2
2SC2021 GR	Q8, Q9	Q4, Q5	
2SK30A GR	Q5, Q7		
1S2076		D1, D4 — D7	
TLR 124	D1 — D6		
μPC4558	IC1, IC2	IC3, IC6	

PARTS		AC 100V	AC 117V	AC 220V/240V
FUSE	F1	MGP 0.75A	MGP 0.75A CSA	CEE 200mAT
FUSE	F2	JUMP WIRE	J W	CEE 2 AT
FUSE	F3	J W	J W	CEE 1.6AT
FUSE	F4	J W	J W	CEE 1.6AT
POWERTRANS		022H47 J	022H47C	022H47 D
CAPACITOR	C1	ECQE10473MZ	ECQU1A 473ME	ECQU2A 473 MZ

※	R5	R16	R17	R20	R54	R57	C23	C25	C26	C27	C101	D6	SW5
HP-60	X	22K	27K	39 K	X	.0068	.033	.056	X	.0068	X	X	
HP-70	5.6K	27K	27K	27K	47K	47K	.0068	.027	.039	.056	0	0	

X = NONE

	SWITCH BOARD	
	HP-60	HP-70
	OPH152	OPH153

	AMP BOARD	
	HP-60	HP-70
	APH035	APH036

	R6,2,9,12,13,14,15	C3	JA2
HP-60	X	X	X
HP-70	O	O	O

AMP BOARD

HP-60 APH035 (141H035)
HP-70 APH036 (141H036)
(pcb 052H319A)

Washer
3 x 8 x 0.8mm
Nut 3mm
3 x 10mm Binding
LA4440
µPC14315, 2SB596Y
PCB

Spacer
Nut 3mm
AC311
Sholder washer

3 x 6mm Binding
SKM3
PCB
Long nut #9

Heat sink H28
3 x 6mm Binding

mounted on foil side.

Heat sink H28

IC1   2SB596Y   IC2   µPC14315

JACK HLJ0259-01-010
JACK HLJ0259-01-030
SWITCH HSW0372-01-030
EVH-OTAS10B14   10kB

2W Resistor
Glass Tube
Sleeve
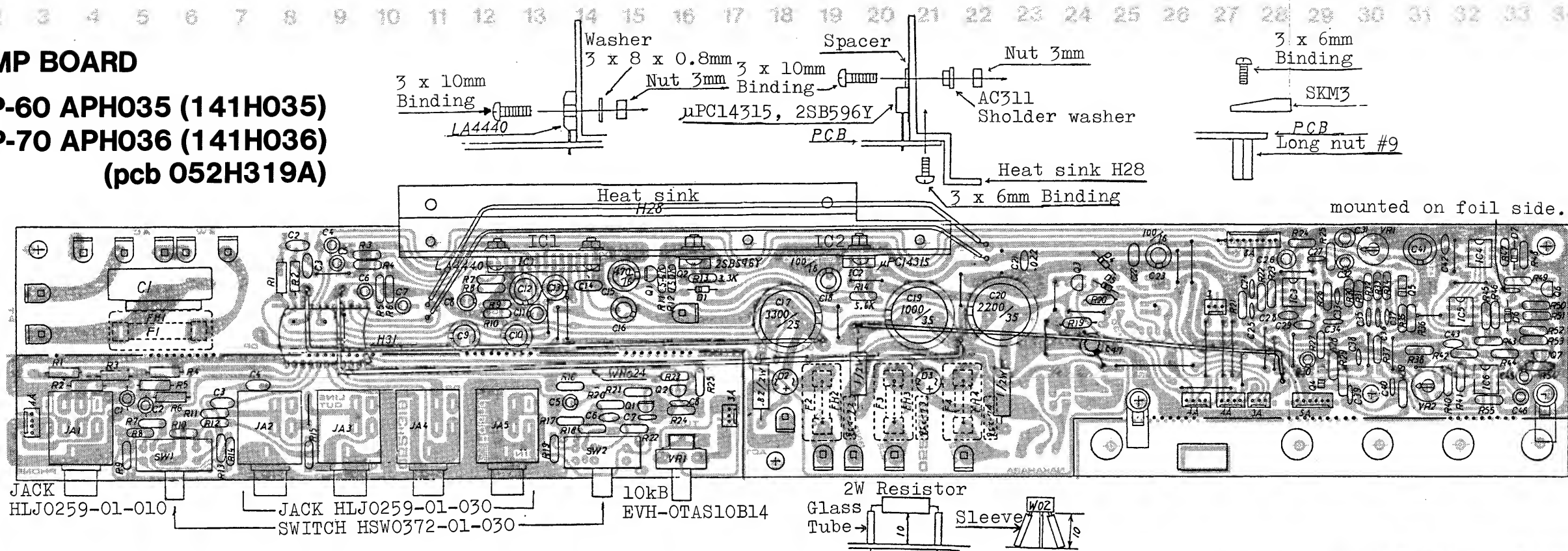
2SC2021R
2SC1815GR
2SA1015GR
1S2076 (1S1555)
TL4558 (µPC4558)
2SK30GR
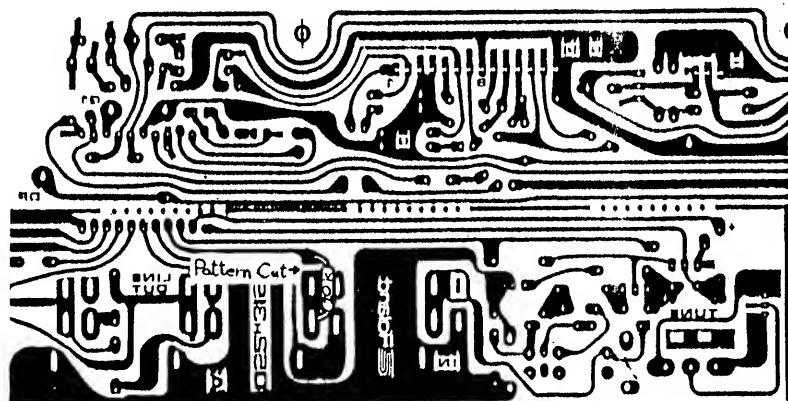
FUSE, FUSE HOLDER (———— jumper)

	100V	117V	220/240V
F1	MGP 0.75A	MGP 0.75A CSA	CEE T200mA
F2			CEE T2A
F3			CEE T1.6A
F4			CEE T1.6A
FH1 FH2 FH3 FH4	NONE	NONE	TF758
C1	ECQU1A473MC	ECQU1A473ME	ECQU2A473MF
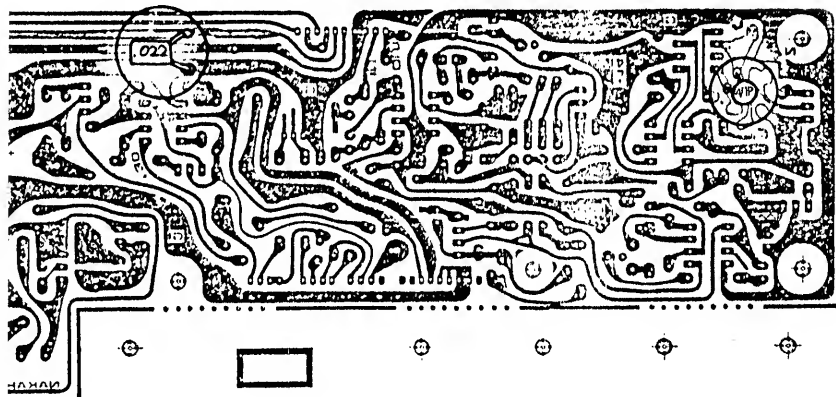
SWITCH BOARD   HP-60 OPH152 (149H152)/HP0-70 OPH153 (149H153)   (pcb 052H320A)

HP-60: EWH-72AP20A14(10kA)   EWH-HBA361A14   EWH-HBA361B14   Push Switch
HP-70: EWJ-EJAP20A14(10kA x 2)   (10kA)   (10kB)   HP-60: SUT42A/HP-70: SUT52A

View from foil side

Holder H124   3 x 4mm Pan

VR1   VR2   VR3   SW1 SW2 SW3 SW4   SW5

Roland

5234-3A   5234-8A   5234-4A

5
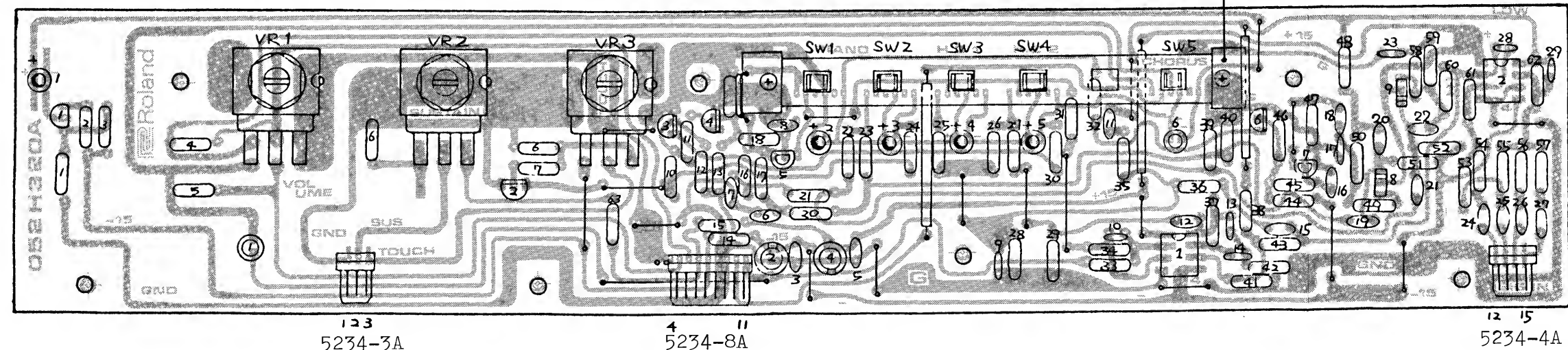
Replacement for
TMS3615 with
number label
must be of the
same number.

See Parts List.

RED

BLACK

View from foil side

ICs
IC2.IC5 : BA662
IC3,IC4 : PC4558N or TL4558

Transistors
All PNP : 2SA1015GR
All NPN : 2SC1815GR
All FET : 2SK30GR

Diodes
D1 : RD4.7EB2
D2 : 1SS84
D3~D13 : 1S2076
or
1S1555

RESISTORS AND CAPACITORS WITHOUT VALUE
DIFFER FROM NOTE TO NOTE AND SERIAL NUMBERS.
SEE BACK PAGE.

TMS3615 WITH NUMBER LABEL
The IC is a selected one and must be replaced only
by the same number. SEE PARTS LIST FOR DETAIL.

RESISTANCE & CAPACITANCE
R1 through C3 in the tables are different with Serial Numbers.
Those in the rightmost columns remain unchanged.

HP-60 — C3, C12 : CE04-W-MD (Low Leakage)

GATE	KEY	R1	R2	R5	R8	R10	R11	C1	C2	C3	R1	R2	R5	R8	R10	R11	C1	C2	C3
										Serial No. up to 121199									
										Serial No. with 121200									
GTH 050	C6	180K	560K	8.2K	33K	680K	220K	.027	.047	1/50	120K	330K	3.9K	33K	680K	220K	.039	.047	1/50
	B6							.027									.039		
	A'6							.018									.027		
	A6							.027									.039		
	G'6							.018									.027		
	G6							.027									.039		
	F'6				820K			.018							820K		.027		
	F6							.027									.039		
	E5							.027									.039		
	D'5							.018									.027		
	D5							.027									.039		
	C'5							.018									.027		
	C5			39K		270K		.027					39K		270K		.039		
	B5							.027									.039		
	A'5							.018									.027		
	A5							.027									.039		
	G'5							.018									.027		
	G5			680K	180K			.027		1.5/50			56K				.039		
	F'5							.018									.027		
	F5							.027									.039		
	E4							.027									.039		
	D'4							.018									.027		
	D4							.027									.039		
	C'4							.018									.027		
GTH 049	C4	180K	560K	8.2K	47K	820K	220K	.027	.047	1.5/50	120K	330K	3.9K	47K	820K	220K	.039	.047	1.5/50
	B4							.027									.039		
	A'4							.018									.027		
	A4							.027									.039		
	G'4							.018									.027		
	G4			1M	180K			.027		2.2/50			56K	1.2M			.039		
	F'4							.018									.027		
	F4							.027									.039		
	E3							.027									.039		
	D'3							.018									.027		
	D3							.027									.039		
	C'3							.018									.027		
	C3	150K	470K	6.8K				.033	.056		100K	270K	3.3K	47K	1M	180K	.047	.056	2.2/50
	B3							.033									.047		
	A'3							.022									.033		
	A3							.033									.047		
	G'3							.022									.033		
	G3				150K			.033							150K		.047		
	F'3							.022									.033		
	F3							.033									.047		
	E2							.033									.047		
	D'2							.022									.033		
	D2							.033									.047		
	C'2							.022									.033		
GTH 048	C2	150K	390K	6.8K	56K	1M	150K	.033	.056	2.2/50	100K	270K	3.3K	56K	1M	150K	.047	.056	2.2/50
	B2							.033									.047		
	A'2							.022									.033		
	A2							.033									.047		
	G'2							.022									.033		
	G2				120K			.033		3.3/50				1.2M			.047		
	F'2							.022									.033		
	F2							.033									.047		
	E1							.033									.047		
	D'1							.022									.033		
	D1							.033									.047		
	C'1							.022									.033		
	C1							.033									.047		

HP-60 — Unless otherwise specified, C in μF.

- GTH 050 region: R12 = 1K, R35 = 220K, R38 = 22K, R42 = 22K, C5 = 0.022, C8 = 0.0022, C9 = 0.001, C10 = 220P, C12 = 0.47/50V, C15 = 100P, C18 = 0.0015
- GTH 049 region: R12 = 1K, R35 = 220K, R38 = 22K, R42 = 22K, C5 = 0.047, C8 = 0.0068, C9 = 0.0022, C10 = 330P, C12 = 1/50V, C15 = 220P, C18 = 0.0033
- GTH 048 region: R12 = 1K, R35 = 220K, R38 = 22K, C5 = 0.1, C8 = 0.0082, C9 = 0.0033, C10 = 470P, C12 = 1/50V

HP-70 — C3, C12 : CE04-W-MD (Low Leakage)

GATE	KEY	R1	R2	R5	R8	R10	R11	C1	C2	C3	R1	R2	R5	R8	R10	R11	C1	C2	C3
											Serial No. up to 121299									
											Serial No. with 121300									
GTH 054	G7	180K	560K	8.2K	22K	560K	220K	.027	.047	.47/50	120K	330K	3.9K	22K	390K	150K	.039	.047	.68/50
	F'7							.018									.027		
	F7							.027									.039		
	E6							.027									.039		
	D'6							.018									.027		
	D6							.027									.039		
	C'6				33K	680K		.018		.68/50				33K	680K	220K	.027		
	C6							.027									.039		
	B6							.027								270K	.039		
	A'6							.018									.027		
	A6							.027							820K		.039		
	G'6							.018									.027		
GTH 054	G6			47K	820K			.027		1/50			47K	560K	180K		.039		1/50
	F'6							.018									.027		
	F6							.027							680K		.039		
	E5							.027									.039		
	D'5							.018								220K	.027		
	D5							.027									.039		
	C'5			68K	270K			.018					68K	820K	270K		.027		
	C5							.027									.039		
	B5							.027									.039		
	A'5							.018									.027		
	A5							.027									.039		
	G'5							.018									.027		
GTH 053	G5	180K	560K	8.2K	82K	680K	180K	.027	.047	1.5/50	120K	330K	3.9K	82K	680K	180K	.039	.047	1.5/50
	F'5							.018									.027		
	F5							.027									.039		
	E4							.027									.039		
	D'4							.018									.027		
	D4							.027									.039		
	C'4				820K	220K		.018						820K	220K		.027		
	C4							.027									.039		
	B4							.027									.039		
	A'4							.018									.027		
	A4							.027									.039		
	G'4							.018									.027		
GTH 053	G4	150K	470K	6.8K	68K	1M	180K	.033	.056	2.2/50	100K	270K	3.3K	68K	1M	180K	.047	.056	2.2/50
	F'4							.022									.033		
	F4							.033									.047		
	E3							.033									.047		
	D'3							.022									.033		
	D3							.033									.047		
	C'3							.022									.033		
	C3							.033									.047		
	B3							.033									.047		
	A'3							.022									.033		
	A3							.033									.047		
	G'3							.022									.033		
GTH 052	G3	150K	470K	6.8K	82K	1M	150K	.033	.056	2.2/50	100K	270K	3.3K	82K	1M	150K	.047	.056	2.2/50
	F'3							.022									.033		
	F3							.033									.047		
	E2							.033									.047		
	D'2							.022									.033		
	D2							.033									.047		
	C'2							.022									.033		
	C2							.033									.047		
	B2							.033									.047		
	A'2							.022									.033		
	A2							.033									.047		
	G'2							.022									.033		
	G2		390K		68K	120K		.033		3.3/50				68K	120K		.047		3.3/50
	F'2							.022									.033		
	F2							.033									.047		
	E1							.033									.047		
	D'1							.022									.033		
	D1							.033									.047		
	C'1				1.2M			.022						1.2M			.033		
	C1							.033									.047		
	B1							.033									.047		
	A'1							.022									.033		
	A1							.033									.047		
GTH 051	G1	150K	390K	6.8K	68K	1.2M	120K	.033	.056	3.3/50	100K	270K	3.3K	68K	1.2M	120K	.047	.056	3.3/50
	F'1							.022									.033		
	F1							.033									.047		

HP-70 — Unless otherwise specified, C in uF.

- GTH 054 region: R12 = 1K, R35 = 220K, R38 = 22K, R42 = 10K, C5 = 0.022, C8 = 0.0022, C9 = 0.001, C10 = 100P, C12 = 0.33/50V, C15 = 100P, C18 = 0.0015
- GTH 053 region: R12 = 1K, R35 = 220K, R38 = 22K, R42 = 22K, C5 = 0.22, C8 = 0.0047, C9 = 0.0022, C10 = 220P, C12 = 0.68/50V, C15 = 220P, C18 = 0.0027
- GTH 052 region: R12 = 470, R35 = 100K, R38 = 22K, R42 = 22K, C5 = 0.1, C8 = 0.01, C9 = 0.0033, C10 = 470P, C12 = 1/50V, C15 = 330P, C18 = 0.0082
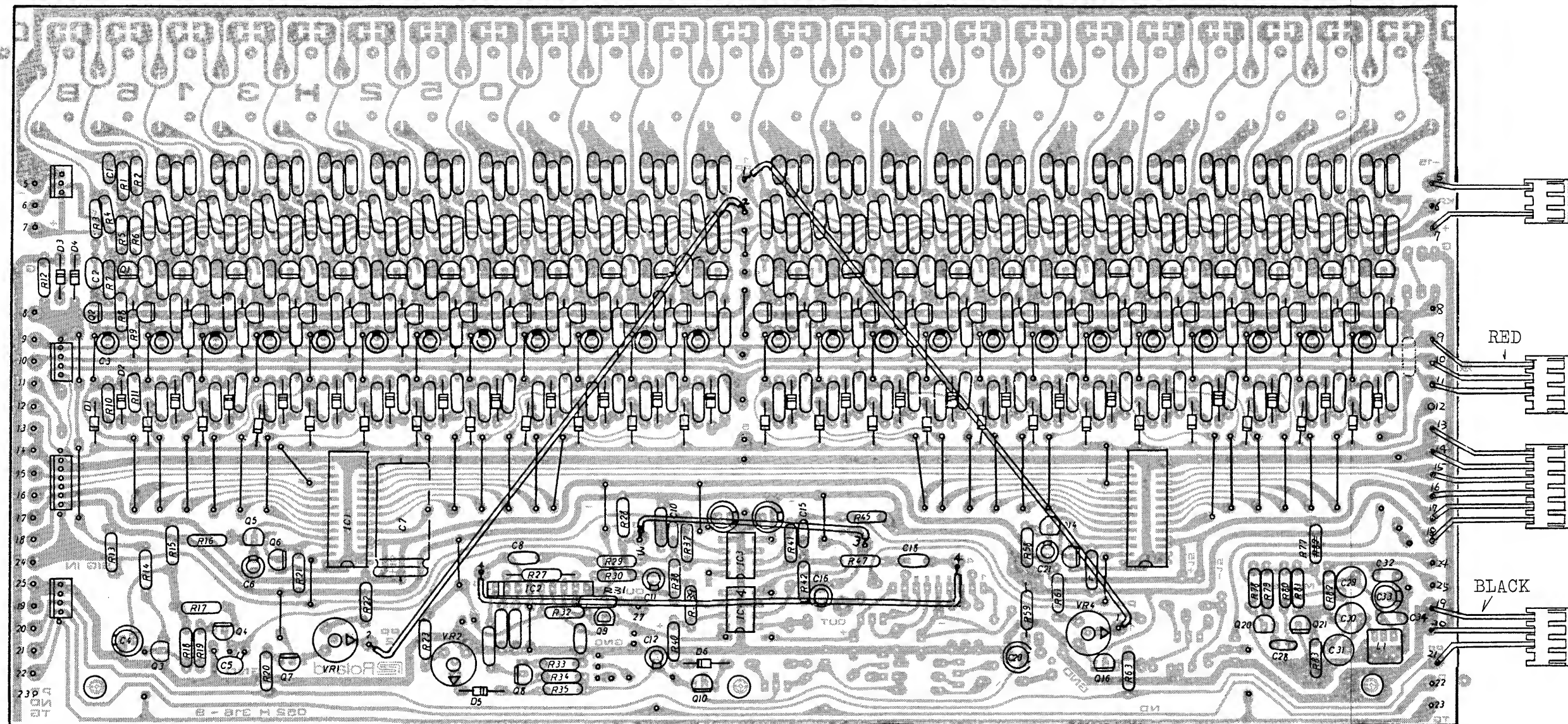
GATE BOARD

HP-60 GTH049 (147H049) GTH050 (147H050)

HP-70 GTH053 (147H053) GTH054 (147H054) (pcb 052H316B)

GTH049
GTH053

RED

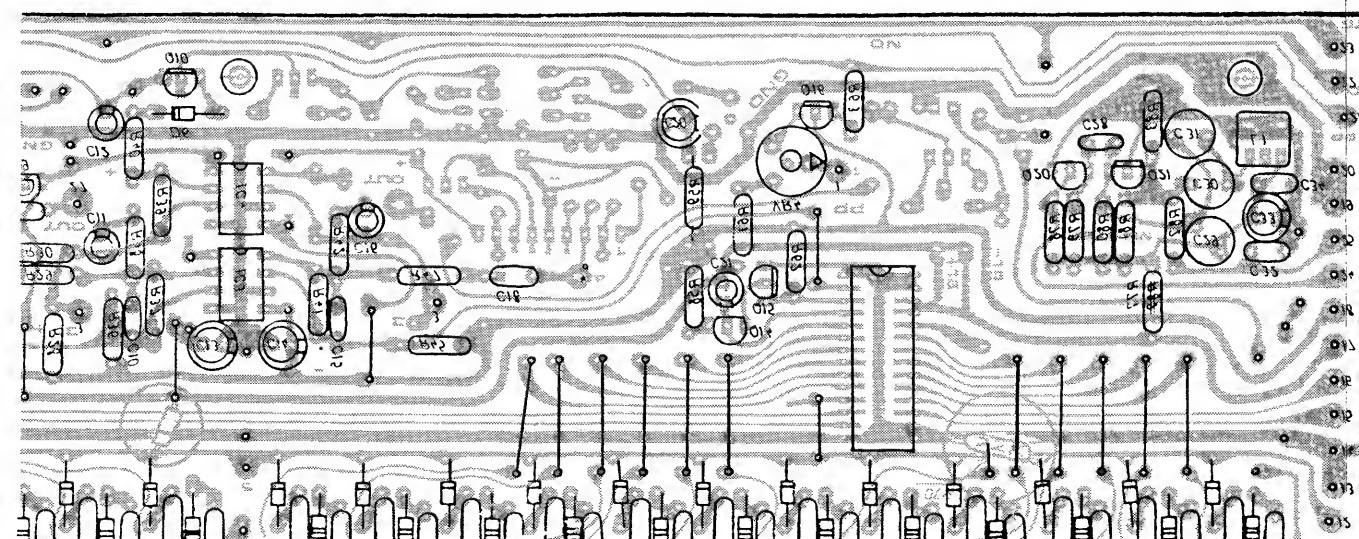BLACK
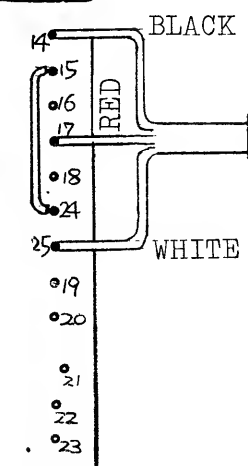
View from foil side

GTH050
GTH054

BLACK

RED

WHITE

TMS3615 NS-RI — RD4.7E B2
TL4558(µPC4558) — ISS84 (low leakage)
BA662A RED — IS2076(IS1555)
2SA1015GR — CE04 W MD (low leakage)
2SC1815GR
2SK30GR

TMS3615 with number label
needs replacement to be
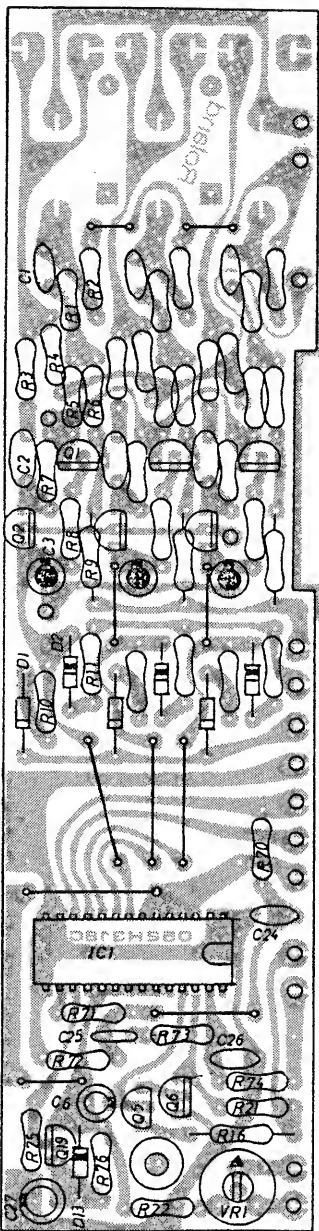the same number.
See Parts List for detail.
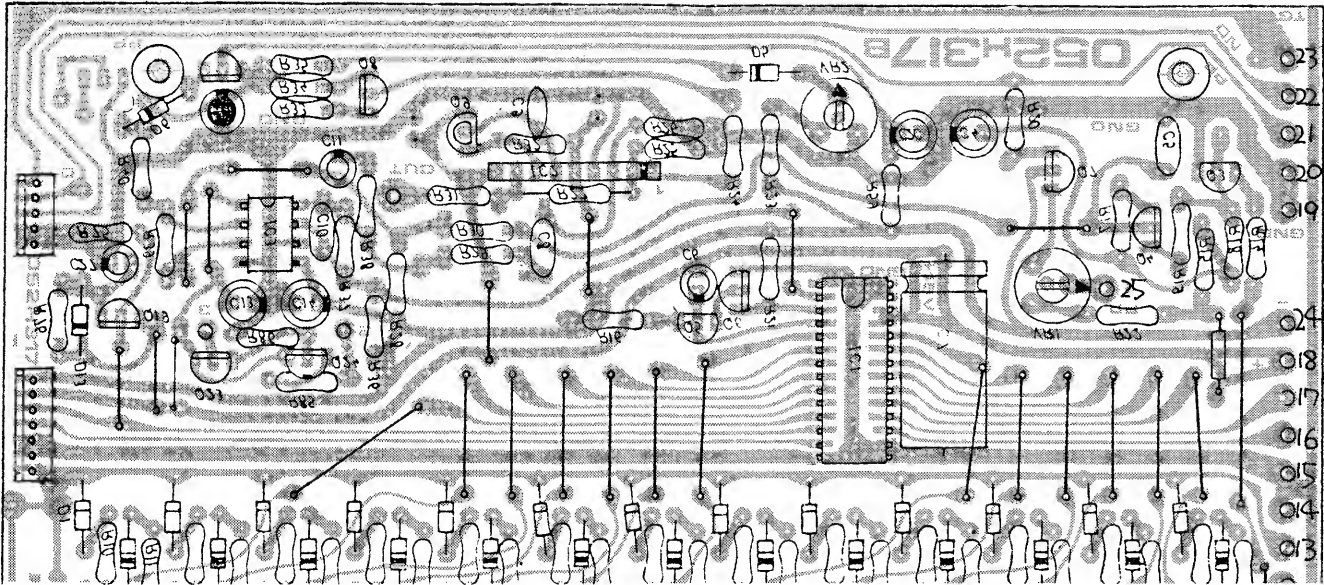
GATE BOARD

HP-60 GTH048
(147H048)
(pcb O52H317B)

View from
foil side

When replacing number labeled
TMS3615, use the same no. only.
See Parts List for detail.
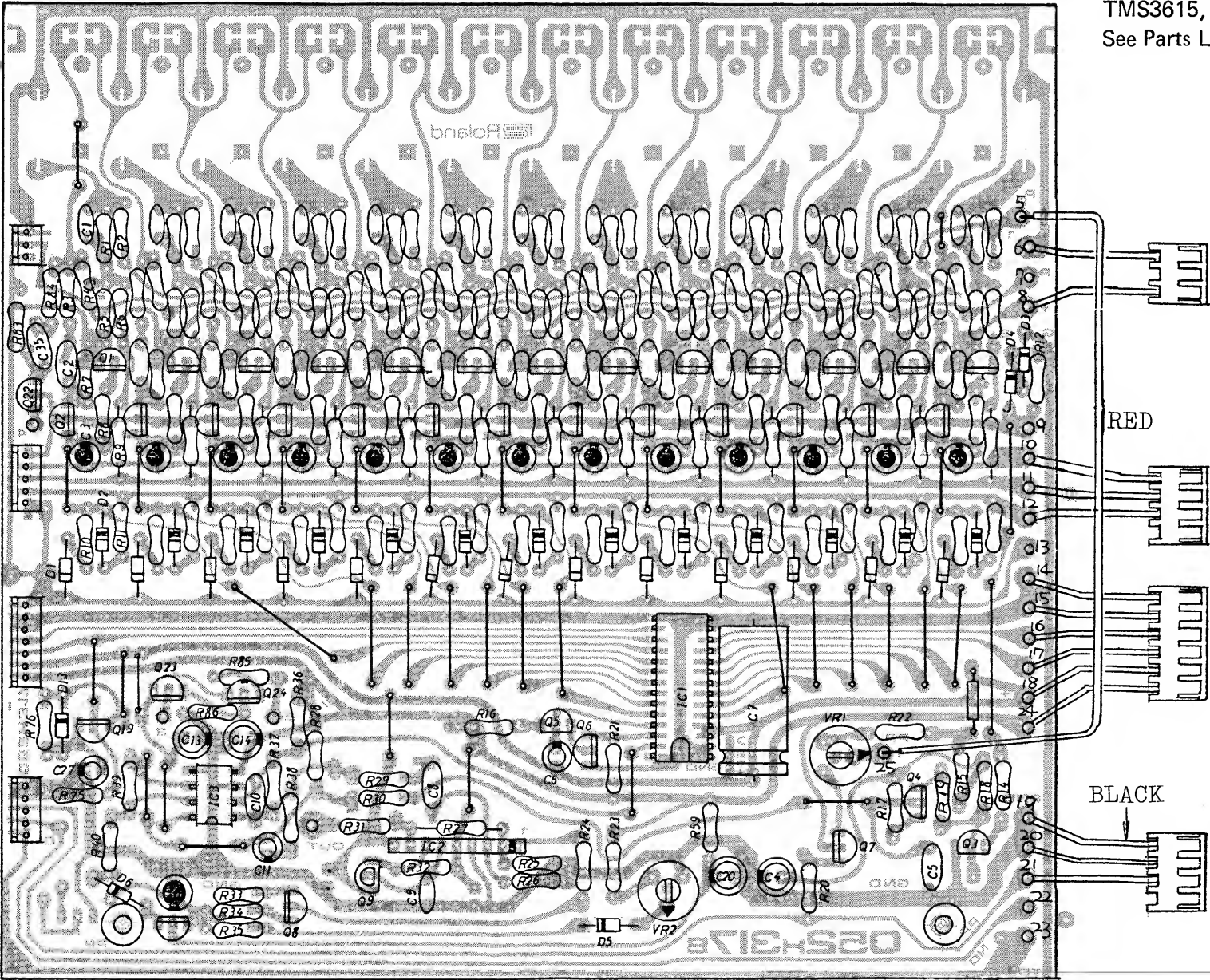
GATE BOARD

HP-70 GTH-051
(147H051)
(pcb O52H318C)

View from
foil side

RED

BLACK

⬤ ── low lekage